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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,802	07/28/2000	Dwight J. Petruchik	81317RLO	3584

1333 7590 08/22/2003

PATENT LEGAL STAFF
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EXAMINER

DONG, DALEI

ART UNIT PAPER NUMBER

2875

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/627,802

Applicant(s)

PETRUCHIK, DWIGHT J.

Examiner

Dalei Dong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Drawings***

1. The drawings are objected to because in Figure 3, reference numeral 33 and 34 both points to the same component. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. Claims 1-4, 6-7 and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,556,260 to Itou in view of U.S. Patent No. 6,036,568 to Murouchi in further view of U.S. Patent No. 4,422,732 to Ditzik.

Regarding to claims 1-4, 6-7, 10-11 and 13-14, Itou teaches in Figure 1, a liquid crystal display comprising "a first substrate 11 of the pair of substrates 11 and 12 (*protective sheets*) is made of borosilicate glass and is 0.7 mm thick. On the surface of substrate 11 facing the liquid crystal layer 10 (*a light modulating layer comprising liquid crystalline material and polymeric binder*), there are sequentially laminated a flat light source 31, a first insulation layer 42, and a common electrode 20 (*a transparent first electrically conductive layer*). On the other hand, the second substrate 12 is made of

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the same material and has the same thickness, and on the surface of the second substrate 12, there are mounted a reflecting electrode 21 (*a patterned layer comprising areas of opaque electrically conductive material or ink*), active elements 46 and so on" (column 9, line 45-53).

Itou also teaches in Figure 1, "each of the plurality of portions of reflecting electrode 21 is connected with an active element 46 via a conductor in a through-hole 41(*apertures*). Between the reflecting electrode 21 and active element 46, there are provided a second insulation layer 43 (*a dielectric layer disposed on the patterned layer, the dielectric layer comprising contact apertures to the areas of opaque electrically conductive material*) made of SiN.sub.x and a first irregularity formed layer 45, for insulating therebetween. The first irregularity formed layer 45 is provided in order to form the reflecting electrode 21 that has irregular surfaces. By provision of irregular surfaces on the reflecting electrode 21, the light that has passed through liquid crystal 10 is reflected as scattered light, which provides an advantage in that the background of the user is prevented from being reflected by the reflecting electrode 21 toward the user, and also the whole area of liquid crystal layer 10 is illuminated" (column 11, line 6-20).

However, Itou does not disclose the liquid crystal display is flexible and the protective sheets are subjecting to conditions of temperature and pressure effective to cause the protective sheet to adhere to the surface.

Murouchi teaches in Figure 1, "After such a rough alignment is carried out, the upper and lower substrates 2 and 1 are pressed on each other by means of the upper and lower stages 7 and 6 (S4) (FIG. 23(c))" (column 5, line 6-8).

Murouchi also teaches in Figure 1, "then, the temporary fixing resins 3 serving as the UV curing agents applied at step S1 are irradiated with ultraviolet light by means of UV lamps 9 to be cured to carry out a temporary fixing (S6)." (column 5, line 11-15).

Murouchi further teaches in Figure 1, "then, the sealing jig filling is carried out with respect to the pair of substrates 1 and 2 temporary fixed to each other (S8)" (column 5, line 21-23).

Murouchi further yet teaches in Figure 1, "in this state, the sealing resin (sealing material) 4 is heated to be cured so that the sealing is carried out (S9)" (column 5, line 24-25).

However, Murouchi fails to teach a flexible liquid crystal display. Ditzik teaches in Figure 5, "one thick rigid substrate and a plurality of optically clear, thin flexible membranes. In the embodiment shown, the front electrode 55B is not coated onto a thick glass substrate, as on other known LC panels, but rather it is deposited on an optically clear 2-5 mil polyester film 58A. This film 58A(*flexible substrate*), is placed over the liquid crystal layer 51 to form the cell. Indium-tin oxide coated polyester membranes are available in thickness 3-7 mils from Seirracin Incorporated, under the INTREX product name. An alternate transparent membrane could be ITO coated Corning MICROSHEET glass. The purpose of the thin transparent flexible membrane 58A is that it can be sandwiched into place in such a manner as to follow the irregularities of the rear electrode-substrate surface. This produces a relatively constant thickness LC layer, over large areas. Thus, it is possible to build liquid crystal panels that are many times larger than previously realized. To provide some rigidity to the membrane 58A, another

polyester of MICROSHEET membrane 58B (*second protective sheet*), is bonded to the first membrane 58A with an optically clear epoxy glue. When the epoxy cures, the two films will be relatively rigid and the LC layer thickness will be held constant. The epoxy glue to be employed can be the same type used to bond faceplates to CRT screens. To further protect the liquid crystal cell, the front substrate 54B is placed over the LC sandwich separated by perimeter spacers 52B, creating an air gap 59. Although the air gap 59 is kept to a minimum, it shall be large enough to clear all dimensional irregularities of the film layers 58A and 58B. Since moisture reacts with liquid crystal compounds, a suitably hermetic water tight seal is necessary around the perimeter of the panel 50. Standard seals, such as glass frits, solder glasses, or polymeric materials can be employed. Preferably the panel spacer and seal may be combined into one element performing both functions” (column 7, line 42 to column 8, line 14).

It would have been obvious one having ordinary skill in the art at the time the invention was made to have add the flexible membranes of Ditzik to the liquid crystal display of Itou and manufacture the display utilizing the method of Murouchi in order to reduce irregularities in thickness of the display device and reduce scars during manufacturing process and thus improve the picture quality of the liquid crystal display.

Regarding to claim 9, Itou in view of Murouchi in further view of Ditzik discloses the claimed invention except for the claimed optimum ranges of temperature and pressure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have choose an optimum ranges of temperature and pressure

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for the sealing of the display, further since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding to claim 12, it has been held that to be entitled to weight in method claims, the recited-structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a structure of a particular structure. *Ex parte Pfeiffer*, 1962 C.D. 408 (1961).

4. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,556,260 to Itou in view of U.S. Patent No. 6,036,568 to Murouchi in further view of U.S. Patent No. 4,422,732 to Ditzik and yet in further view of U.S. Patent No. 3,816,786 to Churchill.

Regarding to claims 5 and 15, Itou in view of Murouchi and in further view of Ditzik discloses the claimed invention except for the liquid crystalline material comprises cholesteric material and the polymeric binder comprises dionized gelatin.

Churchill teaches "Various natural and synthetic film-forming polymeric materials can be employed to constitute the polymeric matrix, film or coating in which the individual droplets or inclusions of cholesteric liquid crystal material are located. Any transparent or substantially transparent film-forming polymeric material with adequate electrical insulation properties and which is soluble in a liquid which does not dissolve or substantially chemically affect the liquid crystal material adversely can be

used. Suitable representative film-forming polymeric materials for this purpose include, but are not limited to, the following: polyvinyl alcohol; gelatin, gum arabic, zein, a prolamine film former derived from the alcohol extraction of zeamays, a grain commonly called Indian corn; hydroxy ethyl cellulose; polyvinyl pyrrolidone; polyethylene oxide; copolymers of ethylene and maleic anhydride; copolymers of vinyl methyl ether and maleic anhydride; etc. The cholesteric liquid crystals can be dispersed or positioned within the polymer matrix conveniently by emulsifying minute droplets of liquid crystal material in a dryable liquid solution of the film-forming polymeric material which is to constitute the polymer matrix. According to a preferred embodiment of this invention, the droplets of liquid crystal material are emulsified in an aqueous solution of film-forming polymer. Since an extremely small droplet size of cholesteric liquid crystal material can be maintained in an emulsion, coatings of films prepared therefrom allow a good optical resolution and have a smooth surface(s). These characteristics enhance the optical or visual readout of display devices containing the droplets in the matrix. In general individual droplet size can range from about 0.5 to about 50 microns, but usually the individual droplet size ranges from about 1 to about 30 microns. Average droplet size can range from about 1 to 30 microns but usually ranges from about 5 to about 20 microns. Films prepared by drying these emulsions, containing the minute individual liquid crystal droplets or inclusions, can be stained or tinted as desired to enable the polymer matrix to serve as a color filter for light traveling to and from the liquid crystal material. Such a system can be used where a narrowing of the broad iridescent effect present in some liquid crystal materials in the second and third chromatic states is

desired. Moreover, such films can also be pigmented slightly, but care should be exercised to avoid use of an excessive amount of pigment or other non-light reflecting material as it can diminish the color response and brilliance due to interference with incident and reflected light” (column 5, line 17-67).

It would have been obvious one having ordinary skill in the art at the time the invention was made to have add the flexible membranes of Ditzik and the liquid crystal material of Churchill to the liquid crystal display of Itou and manufacture the display utilizing the method of Murouchi in order to improve the quality of the light emitted and reduce irregularities in thickness of the display device and reduce scars during manufacturing process and thus improve the picture quality of the liquid crystal display.

5. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,556,260 to Itou in view of U.S. Patent No. 6,036,568 to Murouchi in further view of U.S. Patent No. 4,422,732 to Ditzik and yet in further view of U.S. Patent No. 6,091,196 to Codama.

Itou in view of Murouchi and in further view of Ditzik discloses the claimed invention except for the adhesive resin is selected from the group consisting of homopolymer and co-polymer adhesive resin.

Codama teaches “After the protective layer has been formed, it is advantageous to bond thereto a sealing sheet so as to give a structure in which a region that excludes at least part of the terminal electrode 3 is sealed between the substrate 1 and the sealing sheet. This makes it possible to prevent the infiltration of moisture, and also increases

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the mechanical strength. Adhesion of the sealing sheet may be carried out using a photocurable adhesive, an epoxy adhesive, a silicone adhesive, or a crosslinked ethylene-vinyl acetate copolymer adhesive sheet, to name a few examples. Glass, ceramic, metal, resin or the like may be used as the sealing sheet” (column 13, line 16-26).

It would have been obvious one having ordinary skill in the art at the time the invention was made to have add the flexible membranes of Ditzik and seal the liquid crystal display of Itou with adhesive of Codama and manufacture the display utilizing the method of Murouchi in order to improve the seal of the device and prevent impurities from entering the display device and reduce irregularities in thickness of the display device and reduce scars during manufacturing process and thus improve the picture quality of the liquid crystal display.

Response to Arguments

6. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of a process of manufacturing a liquid crystal display.

U.S. Patent No. 4,023,259 to Kubota.

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U.S. Patent No. 5,766,694 to West.

U.S. Patent No. 5,767,931 to Paczkowski.

U.S. Patent No. 5,854,664 to Inoue.

U.S. Patent No. 5,942,066 to Sunaga.

U.S. Patent No. 6,211,938 to Mori.

U.S. Patent No. 6,275,277 to Walker.

U.S. Patent No. 6,330,099 to Sojourner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.
August 5, 2003



THOMAS M. SEMBER
PRIMARY EXAMINER